

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN OR RELATING TO FLUID CONTROL VALVES

(71) We, THE SANDALL PRECISION COMPANY LIMITED, of Bletchley, in the County of Buckinghamshire, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to fluid control valves and consists in a fluid control valve for selectively establishing fluid-passing communication between a first connection and a selected one of a plurality of second connections, the valve including a circular distributor member located in a chamber in a body and having a generally flat surface arranged to co-operate with a flat surface of the said chamber, the distributor member being so arranged to be rotatable about an axis perpendicular to its said flat surface and having an integral spindle, coaxial with said axis of rotation, extending from the surface of the member opposite to the said flat surface thereof and protruding from the body, the distributor member being capable of limited movement, within the chamber, axially of said spindle and having fluid passageways arranged to connect a first connection passage in the body to a selected one of a plurality of second connection passages in the body in accordance with the rotational position of the distributor member, and fluid pressure-operated means for loading said distributor member so as to urge said co-operating surfaces into engagement, said loading means comprising a flange on the said spindle and a fixed surface on the body defining a pressure chamber selectively connectable to a supply of pressurised fluid and to an outlet so as to enable selective pressurising and venting of the pressure chamber.

45 The said pressure chamber is conveniently connectable selectively to the pressurised fluid supply and to the outlet connection through a valve means that may be a spool valve.

There may conveniently be means, such as a coil spring retained between a flange on the spindle and a fixed surface on the body, for biasing the distributor member to urge its said flat surface away from the co-operating surface of the body when the said distributor member is unloaded.

An embodiment of the invention is illustrated by way of example in the accompanying drawings, in which:—

Figure 1 is a part sectioned side view of a fluid control valve embodying the invention;

Figure 2 is an enlarged sectional plan view of part of Figure 1, taken in the direction of arrow A;

Figure 3 is an underside view of the valve;

Figure 4 is an underside view of a part of the valve; and

Figures 5 and 6 are fragmentary sectioned views taken on lines X—X and Y—Y respectively of Figure 2.

Figure 1 shows a control valve 11 that includes a body 12 having a chamber 13 formed therein, in this case by boring out one end of the body 12 and closing off the bore with a bolted cover. The control valve further includes a distributor member in the form of a substantially flat circular distributor plate 15 that is located in the chamber 13 for rotation about an axis perpendicular to its flat surfaces, one of the surfaces co-operating with an adjacent substantially flat surface in the body 12 which forms one wall of the chamber 13. A spindle 16 is formed integral with the distributor plate 15 and extends from the other surface of the plate 15 through a bore to protrude from the body 12. The protruding end of the spindle 16 is adapted for the fitment of a control means in the form of a knob 17 which facilitates rotation of the distributor plate 15 within the chamber 13 about its rotational axis. A radially extending flange 18 is secured on the spindle 16 and a spring 19 is fitted between the flange 18 and a surface on the body 12 to normally bias the distributor

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pressure return connection 50 in the body 12 (see also Figures 3 and 5). A branch drilling 51 connects drilling 49 to the chamber 13.

5 The spool 28 is movable axially in the bore 31 by a pushpull button 52 located at one end of the spool.

The rotary selector valve hereinbefore described is designed for operation in a 10 3,000 p.s.i. hydraulic system, but is also capable of handling pneumatic systems.

In operation, fluid pressure and return lines are connected to inlet connections 21, 22 and 23, and to connections 43 and 50. 15 Connections 21d, 22d and, where provided, 23d at each of the eight stations in the body 12 are connected to eight items of fluid actuated machinery to be selectively operated in sequence by the valve 11. The 20 correct station is selected by rotation of the distributor plate 15 by the control knob 17 and is indicated on a suitable position indicator (not shown) through the electrical contacts 26. Alignment of the drillings 21c, 22c and 23c in the distributor plate with 25 connections 21d, 22d and 23d in the cover is ensured by the peg and detent 27 being operative at each of the eight stations.

With the spool 28 in the position shown 30 in Figure 2, pressurised fluid flows into chamber 35 and out through chamber 34 and drillings 44 and 45 to chamber 46 to load the co-operating surface of the distributor plate 15 against the adjacent 35 surface of the body 12 to effect leakproof joints with seals 25.

For the purposes of description it will be assumed that fluid pressure is supplied to connection 21 and returns from connection 40 22 to operate fluid motors (not shown), and that fluid pressure is supplied to connection 23 to provide an additional facility at two only of the eight stations provided. The fluid flows into drilling 21a and through drillings 21b and 21c and connection 21d to 45 actuate the motor (not shown), the return flow from the motor flowing through connection 22d and drillings 22c, 22b, annulus 22a and connection 22. The fluid pressure at connection 23 flows through the 50 angular drilling into annulus 23a and through drillings 23b and 23c to connection 23d (where provided). At the six stations where connection 23d is not provided, the 55 surface of the body 12 to effect leakproof joints with seals 25.

When it is required to move to the next station, the fluid supplies to connections 21 and 23 are stopped. The push button 52 is 60 depressed to move the spool 28 in the bore 31 so that head 29 co-operates with the land 36 to shut off the fluid supply to the chamber 46. The spring 19 acts on the flange 18 to move the plate 15 65 away from the co-operating surface

of the body 12 to break the joint with the seals 25; this movement causes exhausting of the fluid from chamber 46 through drillings 45, 44, chamber 34, 38, and drillings 48, 49, and return connection 50. Chamber 13 is vented through connection 51. The distributor plate 15 is then rotated by the knob 17 to connect with the next desired station, this rotation being facilitated by the bearings 20, and is re-loaded by the integral ram by moving the spool 28 back to the position shown in Figure 2.

Although one embodiment only has been described and illustrated, it is to be understood that various modifications can be made without departing from the scope of the invention. For instance, the valve could be adapted to connect a single fluid inlet connection to any selected one of a plurality of outlet connections, or, in the 85 embodiments similar to that described, the number and arrangement of fluid connections at each concentrically arranged station can be varied widely to suit many different applications, as also can the number of stations provided. Corresponding changes in the fluid pressure and return connections can also be made. The position indicating electrical 90 contacts may be replaced by a pointer rotated by the knob 17 over the upper surface of the body 12, which can be suitably marked to provide position indication. A lever mechanism may be 100 incorporated to operate the push-pull button 52.

WHAT WE CLAIM IS:—

1. A fluid control valve for selectively establishing fluid-passing communication between a first connection and a selected one of a plurality of second connections, the valve including a circular distributor member located in a chamber in a body and having a generally flat surface arranged to co-operate with a flat surface of the said chamber, the distributor member being so arranged to be rotatable about an axis perpendicular to its said flat surface and having an integral spindle, coaxial with said axis of rotation, extending from the surface of the member opposite to the said flat surface thereof and protruding from the body, the distributor member being capable of limited movement, within the chamber, axially of said spindle and having fluid passageways arranged to connect a first connection passage in the body to a selected one of a plurality of second connection passages in the body in accordance with the rotational position of the distributor member, and fluid pressure-operated means for loading said distributor member so as to urge said co-operating

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COMPLETE SPECIFICATION

4 SHEETS

This drawing is a reproduction of
the Original on a reduced scale
Sheet 1

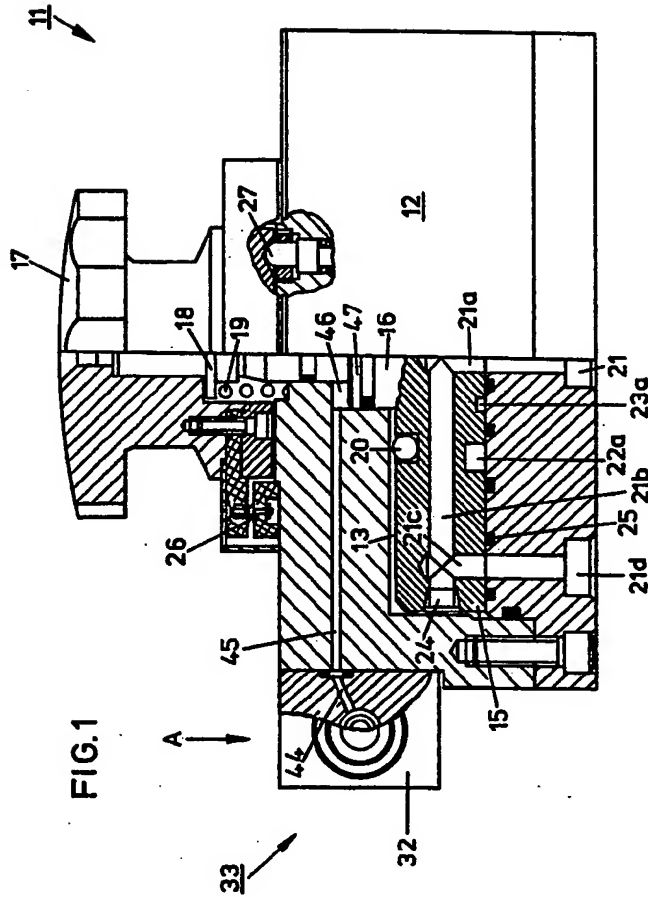


FIG. 1

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